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BUREAU OF MINES MINERALS YEARBOOK

# The Mineral Industry of Zimbabwe

UNITED STATES DEPARTMENT OF THE INTERIOR

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UNITED STATES DEPARTMENT OF THE INTERIOR • Manuel J. Lujan, Jr., Secretary

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This publication is a chapter from the current Bureau of Mines Minerals Yearbook, comprising *Volume I, Metals and Minerals; Volume II, Area Reports: Domestic; Volume III, Area Reports: International.* The separate volumes of the Yearbook are sold by the Superintendent of Documents, Washington, D.C. 20402.

# The Mineral Industry of Zimbabwe

By Thomas O. Glover[1]

Zimbabwe's economy was well developed and diversified with a highly developed infrastructure and a very competitive mining industry. The economy had shown definite signs of recovery during the year. The country's inflation rate in 1987 was 15%.

The value of mineral production for 1987 was estimated at $512 million,[2] a 17% increase. The value did not include downstream products such as ferrochromium, iron, and steel that earned the country a further $150.6 million, bringing the total value of mineral production for 1987 to $662.6 million. Local mining companies increased investments in their industry, thus assuring their future as a prime foreign exchange earner and a sound employment provider. The mineral industry accounted for approximately 40% of all foreign exchange earned in 1987.

Zimbabwe saw an increase in the number of foreign companies that were prospecting for minerals or had indicated the intent to do so in the near future. Companies from Australia, Canada, the Republic of South Africa, the United Kingdom, and the United States have expressed a desire to enter into agreements on mineral prospecting with the Zimbabwean Government. During 1987, 15 exclusive prospecting orders were issued compared with 6 in 1986. Incentives for greater investment allowances were contemplated by the Government as a means of encouraging new mining operations.

The Government of Zimbabwe was interested in expanding existing ferrochromium operations. During 1987, Zimbabwe Mining and Smelting Co. (ZIMASCO) was able to operate all six furnaces at its Kwekwe operation and had a seventh small furnace under construction. Two other major units were also under consideration at Kwekwe. All furnaces at Zimbabwe Alloys Ltd. (Zimalloys) will have been commissioned by the end of 1988. Plans were under way at ZIMASCO to increase the production of high-carbon ferrochromium. The Government was also interested in exploiting platinum-group metals (PGM). Some apprehension exists on exploitation of PGM in Zimbabwe owing to projected production increases in the Republic of South Africa. Although PGM operations would be economic by 1987 values, the increased production from the Republic of South Africa might make it difficult for Zimbabwe to be competitive on the world market.

Mineral exploration activity during 1987 was centered on old gold mines and their associated tailings dumps and on petroleum and uranium prospecting sites in the Zambezi Valley. The 1987 amendment to the Mines and Minerals Act allowed the Zimbabwean Government to repossess the mining block on which old tailings were not being reclaimed properly and to reissue permits to other interested parties or to transfer operation to Zimbabwe Mining Development Corp. (ZMDC), the parastatal mining company. Uranium deposits were found near Mashumbi Pools in north-central Zimbabwe near the Zambian border. The uranium exploration was conducted by Saarberg Interplan Uran GmbH of the Federal Republic of Germany. The quantities and grades of the uranium reserves were reported as promising. There was no reported finding of petroleum during 1987.

ZMDC conducted other exploration of diatomaceous earth, molybdenum, and rare-earth deposits. Deposits of high-grade copper were also sought near the Botswana border. Diamond prospects in the Midlands

were investigated by the Shabani and Mashaba Mines (Pvt.) Ltd.

Prior to 1987, all governmental mining investments were held by either the ZMDC or the Industrial Development Corp. (IDC) of Zimbabwe. In 1987, ZMDC was given responsibility for all mining investments, except for two mining-related subsidiaries still held by IDC.

## PRODUCTION AND TRADE

Production of mineral commodities in Zimbabwe, in most instances, increased in 1987. Gold, the most important mineral mined during 1987, was valued at $210.8 million accounting for 32% of the total value of all exported minerals. In addition to newly mined gold, gold metal reserves of $46.4 million were also exported. Zimbabwe was the 12th largest producer of gold in the world; however, its production amounted to less than 1% of the total world production. Production of asbestos was valued at $59 million. The values of chromium, copper, iron ore, nickel, and phosphates also increased during the year.

There were considerable investments by the existing local mining companies in Zimbabwe during 1987. The size of their investments showed optimism regarding mining's earnings in the coming years. A number of foreign companies were also prospecting in the country. Various industry groups argued that, in the interest of promoting mining growth, the Government of Zimbabwe should give greater investment incentives to these companies. They also claimed that the main constraint on the mining industry's economic contribution has been inadequate Government allowances of foreign exchange to purchase maintenance parts and new equipment.

Zimbabwe commenced building a new $4.5 million explosive manufacturing plant at Kwekwe in May 1987. The plant was owned by IDC (51%), Nitro Nobel (Sweden) (25%), and the Swedish Fund for Industrial Cooperation with Developing Countries (24%). The plant, scheduled for completion by March 1988, would produce 4,000 tons of explosives annually for the mining industry.

Zimbabwe's Mines and Minerals Act was amended in 1987. One change provided that dumps on mining locations would have to be worked, if economically viable, and not simply held by claimholders. The new law provided the Ministry of Mines the authority to investigate mine dumps to determine whether any dump that was idle could be economically worked. If so, the claim holder should be ordered to work the dump; and, in case of noncompliance, ordered forfeiture of the claim. Another provision of the amendments stated that only permanent residents or their appointed agents may take out prospecting licenses.

Although, in local value, exports of commodities increased 11% and imports increased 16% during the year, the Zimbabwean dollar depreciated approximately 13% against the U.S. dollar, which left the real value of exports slightly lower for the year. During the year, Zimbabwe utilized the Beira railway and port for more imports and exports than in 1986. U.S. exports to Zimbabwe increased $219 million in 1987. The value of asbestos exported from Zimbabwe during 1987 was $59 million.

**Table 1.—Zimbabwe: Production of mineral commodities[1]**

(Metric tons unless otherwise specified)

| Commodity | 1983 | 1984 | 1985 | 1986[p] | 1987[p] |
|---|---|---|---|---|---|
| METALS | | | | | |
| Aluminum: Bauxite, gross weight | 23,145 | 22,726 | 20,877 | 24,284 | -- |
| Antimony, mine output, metal content[2] | 143 | 256 | 194 | 175 | -- |
| Beryllium: Beryl concentrate, gross weight | 47 | 19 | 38 | 103 | 83 |
| Chromium: Chromite, gross weight, thousand tons | 431 | 477 | 536 | 533 | 570 |
| Cobalt: | | | | | |
| Mine output, recoverable Co content[e] | 73 | 78 | 100 | 76 | 110 |
| Metal (including content of refinery sludges) | 73 | 78 | 92 | 76 | 110 |
| Columbium and tantalum: Tantalite concentrate: | | | | | |
| Gross weight, kilograms | 2,480 | 59,000 | 40,000 | 33,000 | 37,000 |
| Cb content[e], do. | 370 | 8,850 | 6,000 | 4,950 | 3,650 |
| Ta content[e], do. | 870 | 20,650 | 14,000 | 11,550 | 6,600 |
| Copper: | | | | | |
| Mine output, Cu content | 21,600 | 24,000 | 21,570 | 21,390 | [e]19,710 |

See footnotes at end of table.

**Table 1.—Zimbabwe: Production of mineral commodities[1] —Continued**

(Metric tons unless otherwise specified)

| Commodity | 1983 | 1984 | 1985 | 1986[p] | 1987[p] |
|---|---|---|---|---|---|
| METALS —Continued | | | | | |
| Copper —Continued | | | | | |
| Metal:[3] | | | | | |
| Smelter, primary[e] | 21,600 | 23,000 | 20,670 | 20,500 | 19,000 |
| Refinery, primary | 21,560 | 22,687 | 20,389 | 20,423 | 18,819 |
| Gold, mine output, Au content thousand troy ounces | 453 | 478 | 472 | 478 | 473 |
| Iron and steel: | | | | | |
| Iron ore: | | | | | |
| Gross weight thousand tons | 926 | 927 | 1,100 | 1,110 | 1,328 |
| Fe content[e] do. | 555 | 555 | 660 | 670 | 824 |
| Metal: | | | | | |
| Pig iron[e] do. | 584 | 400 | 674 | 644 | 575,000 |
| Ferroalloys: | | | | | |
| Ferromanganese | 2,085 | 1,845 | 2,044 | 2,000 | -- |
| Ferrochromium | 157,914 | 177,800 | 156,000 | 155,000 | 212,300 |
| Ferrosilicon | 27,542 | 42,482 | 53,527 | 50,000 | 21,192 |
| Total | 187,541 | 222,127 | 211,571 | 207,000 | 233,492 |
| Steel, crude thousand tons | 672 | 391 | [e]465 | 490 | 515 |
| Nickel: | | | | | |
| Mine output, Ni content[e] | 12,020 | 12,150 | 11,116 | 10,370 | 12,320 |
| Metal, smelter[4] | 10,146 | 10,251 | 9,381 | 9,730 | 10,394 |
| Platinum-group metals: | | | | | |
| Platinum troy ounces | 1,693 | 772 | 611 | 836 | 579 |
| Palladium do. | 2,395 | 1,222 | 965 | 1,125 | 932 |
| Total do. | 4,088 | 1,994 | 1,576 | 1,961 | 1,511 |
| Silver, mine output, Ag content thousand troy ounces | 935 | 893 | 799 | 841 | 815 |
| Tin: | | | | | |
| Mine output, Sn content[e] | 1,700 | 1,670 | 1,670 | 1,470 | 1,410 |
| Metal, smelter | 1,234 | 1,210 | 1,207 | 1,079 | 1,038 |
| Tungsten, concentrate output: | | | | | |
| Gross weight | 22 | 55 | 14 | 2 | 1 |
| W content[e] | 15 | 29 | 10 | 2 | 1 |
| INDUSTRIAL MINERALS | | | | | |
| Abrasives: Natural corundum | 5,120 | -- | -- | -- | -- |
| Asbestos thousand tons | 153 | 165 | 173 | 164 | 194 |
| Barite | 980 | 700 | 400 | 298 | 191 |
| Cement, hydraulic thousand tons | 580 | [e]650 | [e]700 | [e]750 | 811 |
| Clays: | | | | | |
| Bentonite (montmorillonite) | 63,097 | [e]64,000 | [e]68,000 | 71,987 | [e]72,000 |
| Fire clay | 9,255 | 8,900 | 9,747 | 12,591 | 16,022 |
| Kaolin | 470 | 1,350 | 1,104 | 901 | 780 |
| Feldspar | 1,645 | 1,399 | 2,300 | 2,026 | 2,962 |
| Gem stones, precious and semiprecious:[5] Emerald kilograms | [e]5 | 8 | 13 | 59 | 1,979 |
| Graphite | 8,000 | 12,334 | 10,450 | 15,000 | 13,530 |
| Kyanite | -- | -- | -- | 1,851 | -- |
| Lithium minerals, gross weight | 19,193 | 22,548 | 27,910 | 32,760 | 14,959 |
| Magnesite | 24,071 | 21,642 | 19,385 | 22,649 | 28,991 |
| Mica | 544 | 911 | 582 | 1,340 | 800 |
| Nitrogen: N content of ammonia thousand tons | 71 | 69 | 69 | 60 | 65 |
| Phosphate rock, marketable concentrates do. | 133 | 134 | 135 | 136 | 155 |
| Pigments, iron oxide[e] | 1,000 | 1,000 | -- | 207 | -- |
| Pyrite, gross weight thousand tons | 57 | 57 | 57 | 63 | 47 |
| Quartz[5] do. | 47 | 32 | 103 | 145 | 41 |
| Stone: Limestone do. | 1,222 | 1,152 | 1,323 | 1,407 | 1,537 |
| Sulfur:[e] | | | | | |
| S content of pyrite do. | 24 | 25 | 25 | 25 | 25 |
| Byproduct of coal and metallurgy do. | 5 | 5 | 5 | 5 | 5 |
| Total do. | 29 | 30 | 30 | 30 | 30 |
| Talc | 551 | 285 | 437 | 797 | 516 |
| MINERAL FUELS AND RELATED MATERIALS | | | | | |
| Coal, bituminous thousand tons | 3,437 | 3,110 | 3,120 | 4,047 | 4,858 |
| Coke, metallurgical[6] do. | 203 | [e]200 | [e]200 | [e]200 | 592 |

[e]Estimated. [p]Preliminary.

[1]Table includes data available through Aug. 12, 1988.

[2]Content of concentrates.

[3]Smelter copper includes impure cathodes produced by electrowinning in nickel processing.

[4]May include Ni content of nickel oxide.

[5]Includes rough and ground quartz as well as silica sand.

[6]Data represent output by the Wankie Colliery Co. Ltd. for years ending Aug. 31 of those stated; additional output by the Redcliff plant of Zimbabwe Iron and Steel Co. may total 250,000 metric tons per year of metallurgical coke and coke breeze.

## Table 2.—Zimbabwe: Apparent exports of mineral commodities[1]

(Metric tons unless otherwise specified)

| Commodity | 1985 | 1986 | Destinations, 1986: United States | Destinations, 1986: Other (principal) |
|---|---|---|---|---|
| **METALS** | | | | |
| Aluminum: | | | | |
| Ore and concentrate | -- | 256 | -- | All to Belgium-Luxembourg. |
| Metal including alloys, unwrought | -- | 63 | -- | All to France. |
| Beryllium: Ore and concentrate | 18 | -- | -- | |
| Chromium: Ore and concentrate | 11,552 | 2,156 | 1,958 | Morocco 198. |
| Cobalt: Metal including alloys, all forms | 1,045 | -- | -- | |
| Columbium and tantalum: | | | | |
| Ash and residue containing columbium and tantalum | -- | 421 | -- | All to West Germany. |
| Metal including alloys, all forms, tantalum value, thousands | [3]$178 | -- | -- | |
| Copper: | | | | |
| Matte and speiss including cement copper | 203 | 602 | -- | Norway 518; West Germany 84. |
| Ash and residue containing copper | 102 | 556 | -- | All to West Germany. |
| Metal including alloys: | | | | |
| Scrap | 10 | -- | -- | |
| Unwrought | [3]17,580 | [3]21,660 | -- | Italy 12,453; Japan 2,017; Austria 1,629. |
| Gold: Metal including alloys, unwrought and partly wrought troy ounces | 643 | 830 | -- | All to Netherlands. |
| Iron and steel: Metal: | | | | |
| Pig iron, cast iron, related materials | [3]28 | [3]605 | -- | NA. |
| Ferroalloys: | | | | |
| Ferrochromium | [r]101,336 | 113,220 | 38,588 | West Germany 33,778; Italy 24,018. |
| Ferromanganese | -- | 93 | -- | Philippines 55; Thailand 38. |
| Ferrosilicochromium | 20,189 | 20,795 | 4,829 | West Germany 14,248; Spain 1,571. |
| Unspecified | 71,264 | 113,125 | -- | West Germany 48,561; Japan 39,879; Italy 24,018. |
| Steel, primary forms | [3]243,495 | [3]158,255 | -- | NA. |
| Semimanufactures: | | | | |
| Bars, rods, angles, shapes, sections | [3]95,484 | [3]139,542 | 25 | NA. |
| Universals, plates, sheets | 14,563 | 3,473 | 2,417 | Morocco 1,048. |
| Hoop and strip | 205 | 29 | -- | All to Morocco. |
| Rails and accessories | [3]4,241 | -- | -- | |
| Wire | [3]10,337 | [3]9,239 | -- | NA. |
| Tubes, pipes, fittings | 33 | 404 | -- | Portugal 295; Netherlands 88. |
| Lead: Metal including alloys, unwrought | 35 | -- | -- | |
| Lithium: Ore and concentrate | [3]28,117 | [3]22,837 | 8,237 | NA. |
| Nickel: | | | | |
| Matte and speiss | 12 | 275 | -- | Norway 260. |
| Metal including alloys, all forms | [r 3]10,896 | [3]14,326 | 2,843 | Japan 3,362; West Germany 1,660. |
| Platinum-group metals: Metals including alloys, unwrought and partly wrought value, thousands | $3 | $51 | -- | Switzerland $31; United Kingdom $20. |
| Silver: | | | | |
| Ore and concentrate do | -- | $1 | -- | All to United Kingdom. |
| Waste and sweepings do | $93 | $2,337 | -- | All to West Germany. |
| Tin: Metal including alloys, all forms | [r 3]1,147 | [3]1,322 | 123 | West Germany 351; France 91. |
| Titanium: Metal including alloys, all forms | [3]73 | -- | -- | |
| Tungsten: Ore and concentrate | [3]36 | -- | -- | |
| Other: | | | | |
| Ores and concentrates | 449 | -- | -- | |
| Ashes and residues | 1,126 | 28 | -- | United Kingdom 21; West Germany 7. |
| Base metals including alloys, all forms | -- | 108 | -- | Norway 103. |
| Precious metals including alloys, waste and scrap value, thousands | [3]$2,282 | [3]$816 | -- | NA. |
| **INDUSTRIAL MINERALS** | | | | |
| Abrasives, n.e.s.: Dust and powder of precious and semiprecious stones including diamond do | -- | $82 | $82 | |
| Asbestos, crude | [3]158,633 | [3]167,970 | 193 | Japan 36,920; Spain 15,577; Italy 8,176. |
| Cement | [3]73,789 | [3]77,929 | -- | NA. |
| Clays, crude | 36 | -- | -- | |

See footnotes at end of table.

**Table 2.—Zimbabwe: Apparent exports of mineral commodities[1] —Continued**

(Metric tons unless otherwise specified)

| Commodity | 1985 | 1986 | Destinations, 1986 | |
|---|---|---|---|---|
| | | | United States | Other (principal) |
| INDUSTRIAL MINERALS —Continued | | | | |
| Diamond: | | | | |
| Gem, not set or strung value, thousands | [2]$2,035 | [2]$ 4,201 | $27 | NA. |
| Industrial stones do. | -- | $26 | -- | All to France. |
| Feldspar, fluorspar, related materials | -- | 180 | -- | All to Taiwan. |
| Fertilizer materials: Manufactured: | | | | |
| Phosphatic | NA | 3,168 | -- | All to Czechoslovakia. |
| Unspecified and mixed value, thousands | [2]$864 | -- | -- | |
| Graphite, natural do. | r [2]4,759 | [2]7,024 | -- | NA. |
| Kyanite and related materials | -- | 18 | -- | All to Japan. |
| Magnesite, crude value, thousands | [2]$417 | [2]$691 | -- | NA. |
| Mica: Crude including splittings and waste | -- | 657 | -- | All to Spain. |
| Precious and semiprecious stones other than diamond: | | | | |
| Natural value, thousands | $741 | $1,396 | $6 | Switzerland $1,901; West Germany $234. |
| Synthetic do. | -- | $30 | $30 | |
| Stone, sand and gravel | [2]264,629 | [2]29,579 | ([3]) | Japan 5,151; Italy 2,121. |
| Other: Crude | r262 | 4,516 | -- | Japan 3,390; West Germany 1,036. |
| MINERAL FUELS AND RELATED MATERIALS | | | | |
| Carbon black | 477 | -- | -- | |
| Coal: All grades including briquets | [2]118,844 | [2]64,645 | -- | NA. |
| Coke and semicoke | [2]89,612 | [2]113,133 | -- | NA. |

rRevised. NA Not available.

[1]Table prepared by Virginia A. Woodson. Owing to a lack of official trade data published by Zimbabwe, this table should not be taken as a complete representation of this country's mineral exports. These data have been compiled from various sources, which include United Nations information, data published by trading partner countries, and partial official trade data of Zimbabwe. Unless otherwise specified, data are compiled from trade statistics of individual trading partners.

[2]Central Statistical Office, Harare, Zimbabwe. Quarterly Digest of Statistics, Dec. 1987.

[3]Unreported quantity valued at $234,000.

**Table 3.—Zimbabwe: Apparent imports of mineral commodities[1]**

(Metric tons unless otherwise specified)

| Commodity | 1985 | 1986 | Sources, 1986 | |
|---|---|---|---|---|
| | | | United States | Other (principal) |
| METALS | | | | |
| Aluminum: | | | | |
| Oxides and hydroxides | 10 | 1 | 1 | |
| Metal including alloys: | | | | |
| Unwrought | 424 | 303 | -- | All from Netherlands. |
| Semimanufactures value, thousands | [2]$7,074 | [2]$8,622 | $258 | NA. |
| Chromium: Oxides and hydroxides | 3 | 4 | -- | All from United Kingdom. |
| Cobalt: Oxides and hydroxides | -- | 1 | 1 | |
| Copper: | | | | |
| Ash and residue containing copper | -- | 54 | 54 | |
| Metal including alloys: | | | | |
| Scrap | 8 | -- | -- | |
| Unwrought | 3 | 16 | 15 | West Germany 1. |
| Semimanufactures | 38 | 99 | 3 | Italy 34; Canada 29; United Kingdom 22. |
| Iron and steel: Metal: | | | | |
| Scrap | -- | 31 | -- | All from United Kingdom. |
| Pig iron, cast iron, related materials | 33 | 46 | -- | Canada 17; Sweden 17; Italy 10. |
| Ferroalloys: | | | | |
| Silicon metal | 2 | 22 | -- | All from United Kingdom. |
| Unspecified | 5 | -- | -- | |
| Semimanufactures: | | | | |
| Bars, rods, angles, shapes, sections value, thousands | [2]$6,048 | [2]$6,561 | -- | NA. |
| Universals, plates, sheets do. | [2]$29,515 | [2]$39,692 | -- | NA. |

See footnotes at end of table.

**Table 3.—Zimbabwe: Apparent imports of mineral commodities[1] —Continued**

(Metric tons unless otherwise specified)

| Commodity | 1985 | 1986 | Sources, 1986: United States | Sources, 1986: Other (principal) |
|---|---|---|---|---|
| METALS —Continued | | | | |
| Iron and steel: Metal —Continued | | | | |
| Semimanufactures —Continued | | | | |
| Hoop and strip | 89 | 360 | -- | Italy 170; Japan 83; Belgium-Luxembourg 82. |
| Rails and accessories | 1 | -- | -- | |
| Wire | 333 | 187 | -- | Belgium-Luxembourg 88; United Kingdom 88. |
| Tubes, pipes, fittings: value, thousands | [2]$4,663 | $3,895 | $4 | NA. |
| Castings and forgings, rough | -- | 225 | -- | All from Italy. |
| Lead: Metal including alloys, semimanufactures | 2 | 1 | -- | All from United Kingdom. |
| Manganese: | | | | |
| Ore and concentrate: Metallurgical-grade | -- | 209 | -- | All from Netherlands. |
| Oxides | -- | 18 | -- | All from Greece. |
| Molybdenum: Metal including alloys, all forms | -- | 2 | -- | All from United Kingdom. |
| Nickel: Metal including alloys, semimanufactures | -- | 4 | (3) | Mainly from United Kingdom. |
| Platinum-group metals: Metals including alloys, unwrought and partly wrought: value, thousands | -- | $7 | -- | All from United Kingdom. |
| Silver: Metal including alloys, unwrought and partly wrought: do. | $3 | $97 | -- | Netherlands $96. |
| Tin: Metal including alloys, semimanufactures | -- | 13 | -- | All from Australia. |
| Titanium: | | | | |
| Oxides | 20 | 3 | -- | All from Denmark. |
| Metal including alloys, semimanufactures | 1 | -- | -- | |
| Vanadium: Pentoxides | -- | 8 | 8 | |
| Zinc: | | | | |
| Oxides | 110 | 28 | -- | Hong Kong 15; Italy 13. |
| Metal including alloys, all forms: value, thousands | [2]$4,106 | [2]$3,793 | -- | NA. |
| Other: Base metals including alloys, all forms | -- | 3 | 2 | United Kingdom 1. |
| INDUSTRIAL MINERALS | | | | |
| Abrasives, n.e.s.: | | | | |
| Natural: Corundum, emery, pumice, etc | 40 | 151 | -- | Greece 139; Italy 12. |
| Grinding and polishing wheels and stones | 22 | [4]12 | (3) | West Germany 5; Norway 3; Italy 2. |
| Boron materials: | | | | |
| Crude natural borates | 134 | -- | -- | |
| Oxides and acids | -- | 4 | 4 | |
| Cement | 2 | -- | -- | |
| Chalk | 77 | 38 | -- | All from France. |
| Clays, crude | 19 | -- | -- | |
| Diamond: | | | | |
| Gem, not set or strung: value, thousands | -- | $2 | -- | All from United Kingdom. |
| Industrial stones: do. | $23 | $2 | $2 | |
| Diatomite and other infusorial earth | 70 | -- | -- | |
| Fertilizer materials: Manufactured: | | | | |
| Ammonia: value, thousands | [2]$6,089 | [2]$9,996 | -- | NA. |
| Nitrogenous | 5 | 9,683 | -- | Belgium-Luxembourg 4,005; West Germany 3,150. |
| Potassic | 10,182 | 18,414 | -- | All from West Germany. |
| Graphite, natural | 1 | 5 | -- | Do. |
| Gypsum and plaster | 18 | 163 | 3 | West Germany 159. |
| Lime: value, thousands | [2]$1,462 | [2]$3,013 | -- | NA. |
| Magnesium compounds: | | | | |
| Magnesite, crude: do. | $8 | -- | -- | |
| Other | -- | 1 | 1 | |
| Mica: Worked including agglomerated splittings | 1 | 1 | -- | All from United Kingdom. |
| Precious and semiprecious stones other than diamond: | | | | |
| Natural: value, thousands | $24 | $125 | -- | All from Switzerland. |
| Synthetic: do. | $1 | -- | -- | |
| Salt and brine | 9,230 | 7,542 | -- | West Germany 7,403; United Kingdom 139. |

See footnotes at end of table.

**Table 3.—Zimbabwe: Apparent imports of mineral commodities[1] —Continued**

(Metric tons unless otherwise specified)

| Commodity | 1985 | 1986 | Sources, 1986 | |
|---|---|---|---|---|
| | | | United States | Other (principal) |
| INDUSTRIAL MINERALS —Continued | | | | |
| Sodium compounds, n.e.s.: Carbonate, manufactured | 18 | 72 | -- | All from France. |
| Stone, sand and gravel: Sand other than metal-bearing | 6 | -- | | |
| Sulfur: | | | | |
| Elemental: | | | | |
| Crude including native and by-product | 75 | -- | | |
| Colloidal, precipitated, sublimed | -- | 4 | -- | All from United Kingdom. |
| Sulfuric acid | 1 | -- | | |
| Talc, steatite, soapstone, pyrophyllite | 20 | 36 | -- | All from Republic of Korea. |
| Other: Crude | 5 | 11 | -- | West Germany 7; United Kingdom 4. |
| MINERAL FUELS AND RELATED MATERIALS | | | | |
| Asphalt and bitumen, natural | 53 | 1 | -- | All from United Kingdom. |
| Carbon black | 909 | 55 | -- | United Kingdom 37; Netherlands 11. |
| Coal: All grades including briquets value, thousands | [2]$7,092 | [2]$15,743 | -- | NA. |
| Petroleum refinery products: | | | | |
| Liquefied petroleum gas 42-gallon barrels | 12 | -- | | |
| Gasoline do. | [r]152,670 | 480 | -- | All from Netherlands. |
| Mineral jelly and wax do. | 7,107 | 12,608 | -- | West Germany 6,753; Hong Kong 4,997. |
| Kerosene and jet fuel do. | 70 | 9 | -- | All from United Kingdom. |
| Distillate fuel oil do. | [r]192,226 | 97 | -- | All from West Germany. |
| Lubricants do. | 5,123 | 10,476 | 88 | West Germany 5,068; France 4,732. |
| Bitumen and other residues do. | 103 | 315 | -- | All from Italy. |
| Bituminous mixtures do. | 8,968 | 503 | -- | All from United Kingdom. |
| Petroleum coke do. | 176 | -- | | |

[r]Revised. NA Not available.

[1]Table prepared by Virginia A. Woodson. Owing to a lack of official trade data published by Zimbabwe, this table should not be taken as a complete representation of this country's mineral imports. These data have been compiled from various sources, which include United Nations information, data published by trading partner countries, and partial trade data of Zimbabwe. Unless otherwise specified, data are compiled from trade statistics of individual trading partners.

[2]Central Statistical Office, Harare, Zimbabwe. Quarterly Digest of Statistics. Dec. 1987.

[3]Less than 1/2 unit.

[4]Excludes unreported quantity exported by Canada valued at $20,000.

[5]Unreported quantity valued at $8,000.

## COMMODITY REVIEW

### METALS

**Chromite.**—The production of chrome ore in Zimbabwe came from 2 major producers and 19 small mining cooperatives. The two major producers, ZIMASCO and Zimalloys, mined almost entirely in the podiform deposits; whereas, the artisan miners worked entirely in the more-difficult-to-excavate stratiform deposits.

The mining cooperatives, which have been in existence since 1982, leased areas that were formerly mined by major companies and then sold the high-grade ore to ZIMASCO and Zimalloys for processing. Mining cooperatives earned more than $5 million from sales of 73,000 tons of chromium ore to ZIMASCO and Zimalloys. The cooperatives supplied about 20% of the chromium ore refined at Gweru and Kwekwe. Zimbabwe had 19 cooperatives mining high-grade chromium ore on the North Dyke. Zimalloys and ZIMASCO received about 27% and 12%, respectively, of their ore from these operations. ZMDC negotiated a guaranteed chromium ore price with the two major producers. The cooperatives received about $20 per ton for chromium ore.

Zimalloys was owned by the Anglo Amer-

ican Corp. Ltd. (60%), John Brown & Co. Ltd. (17%), Old Mutual of Zimbabwe (6%), French interests (5%), and public sources (12%). The company employed 1,330 people at five chromium mining operations and seven small cooperatives. The five mines were the Caesar, Great Dyke, Inyala, Netherburn, and Sutton. The Zimalloys smelter, at Gweru in central Zimbabwe near the mines, produced low-carbon ferrochromium, and ferrosilicon from three batteries that operated 24 hours per day, 365 days per year. Coal and coke to fuel the batteries came from Wankie Colliery Co. Ltd. in northwest Zimbabwe near Victoria Falls. The final products were shipped in 500-kilogram barrels to customers in Australia, Japan, and the United Kingdom.

ZIMASCO, a subsidiary of Union Carbide Corp. of the United States, had 6 mines and 12 small cooperatives producing chromium ore. The company employed 2,577 people at its sites. The producing mines were the Iron Ton, Lalapanz (Cambrae), Magazine Hill, North Section (Railway Block), South Section (Peak), and Valley. ZIMASCO produced only high-carbon ferrochromium at its Kwekwe facilities, utilizing all six furnaces. All coal and coke to fuel the furnaces came from the Republic of South Africa.

During October 1987, the Zimbabwean Government requested most-favored-nation duty-free treatment for its ferrochromium and ferrosilicon exports to the United States. Approval had not been granted by the United States at yearend. The U.S. duties were 3.4% on low-carbon ferrochromium and 10.0% on ferrosilicon at the time of the request.

**Cobalt.**—Bindura Nickel Corp. Ltd. (BNC) was the only local mine producer of byproduct cobalt in Zimbabwe during 1987. The cobalt appears in a low-grade sulfide ore along with nickel, copper, and small amounts of precious metals. BNC, a subsidiary of Anglo American, produced the sulfide ore from four mines in Zimbabwe: Epoch, Madziwa, Shangani, and Trojan. The Trojan refinery treats the ore from all four mines. In addition to local cobalt production, Rio Tinto (Zimbabwe) Ltd. (RTZ) recovered additional byproduct cobalt, on toll, at the Eiffel Flats refinery, processing nickel-copper-cobalt matte from Botswana's Selebi-Phikwe operation.

**Copper.**—Copper ore was produced by two Zimbabwean companies in 1987; Mhangura Copper Mines Ltd. (MCM) and Lomangundi Smelting and Mining (Pvt.) Ltd. (LSM). Another source of copper was Botswana's Selebi-Phikwe nickel-copper matte, which was toll refined for export at RTZ's Eiffel Flats refinery. Copper concentrates were also purchased from the Muconguera Mine in Mozambique for processing.

MCM operated two mines (Miriam and Norah) and the Alaska smelter and refinery. ZMDC owned approximately 55% of MCM. Working profits were improved during the last half of 1987 owing to market conditions and fewer costly plant and equipment breakdowns. Copper sales increased by 8.7% despite a reduction in ore production. MCM also entered into a contract with Lonrho Zimbabwe Investment Group to process a small amount of its copper concentrates at MCM's Alaska smelter. ZMDC was considering the feasibility of upgrading copper cathode for the export market. If the project appeared to be economically sound, it would be carried out at the Alaska refinery.

LSM, a ZMDC company, operated the Angwa and Avondale Mines. The company continued to operate at a loss owing to poor production. The copper ores were processed at the old Shackleton Mine concentrator. Extensive exploration and development work, begun in 1986, was continued in 1987. The ore reserves found were sufficient to extend the life of the mines until 1990.

Lonrho Zimbabwe Ltd. had plans to close its Inyati Mine near Rusape in eastern Zimbabwe during January 1988. The smelter and refinery were scheduled to be closed during April 1988. The mine, which opened in 1902, produced copper and byproduct gold.

**Gold.**—There were 10 main participants in gold activities at 46 sites in Zimbabwe during 1987. Thirty-seven of the sites were mines, four were leaching operations at old mine dumps, three were claims, and two were prospects. Six of the operators were significant producers: Cluff Mineral Exploration (Zimbabwe) Ltd. (CMEZ), Falconbridge Investments (Zimbabwe) (Pvt.) Ltd., Falcon Mines PLC, Lonrho, RTZ, and the parastatal ZMDC.

CMEZ operated the Royal Family Mine and completed feasibility studies on the Freda oxide deposit and the Freda and Rebecca sulfide deposits. CMEZ decided to proceed with the construction of two open pit mines. The Freda oxide mine was scheduled to produce 14,000 troy ounces of gold per year from a 600,000-ton-per-year heap-leaching operation starting early in 1988.

Test pits have shown that the ore can be mined without blasting and treated as is to recover over 80% of contained gold. The Freda-Rebecca sulfide mines were scheduled to produce 50,000 ounces of gold per year from 729,000 tons per year of ore from the two sites. The recovery rate from the plant was to be 85% to 90%, and production was scheduled to begin in late 1988. The Royal Family open pit mine produced approximately 9,000 ounces of gold in 1987 and its first production was in 1984.

Falconbridge operated two underground gold mines, the Blanket and Golden Kopje, producing a total of 24,970 ounces. At the Blanket Mine, 160,000 tons of ore was milled to produce 17,026 ounces of gold. At the Golden Kopje Mine, 79,400 tons of ore was milled to produce 7,944 ounces of gold. Proven and probable ore reserves at the Blanket Mine were 534,000 tons with a grade of 5.3 grams (0.17 ounce) per ton. At the Golden Kopje Mine, proven reserves were 73,000 tons with a grade of 6.1 grams (0.20 ounce) per ton. Falconbridge was developing the Three Cheers Prospect in 1987. This prospect contained 800,000 tons of oxidized surface ore with a grade of 2.0 grams (0.06 ounce) per ton.

Falcon Mines operated the Dalney Group and Venice Group of mines during 1987. In addition, the Old Nick underground mine, owned by Olympus Consolidated Mines Ltd., a subsidiary of Falcon Mines, embarked on a $3 million expansion project to double the tonnage milled. In 1987, approximately 2,000 tons of ore per month was milled that yielded up to 10 grams (0.32 ounce) of gold per ton. After the tonnage of ore to the mill is doubled, the grade will drop to 8 grams of gold (0.26 ounce) per ton. The Dalney Mine was sinking a new 6-meter-diameter shaft that cost $5 million. The new shaft will provide the means to increase production and will increase the feasibility of mining at greater depths, which will in turn increase the life expectancy of the mine. The retreatment of the What Cheer Mine dump was started in 1987 and results were promising.

Lonrho and its subsidiaries operated 11 gold mines in Zimbabwe. Their mines included Anzac, Arcturus, Athens, Gladstone, Howe No. 3, Mazowe, Monarch, Muriel, Redwing, Shamva, and Tiger Reef. Shamva, the third-largest gold producer in Zimbabwe during 1987, was approved for a 2-year major expansion program late in 1987. Expanding the Shamva mill would increase production of gold ore from 13,500 to nearly 20,000 tons per month raising gold production from 1,800 to about 2,570 ounces per month. The expansion at Shamva was expected to cost nearly $10 million. The Tiger Reef Mine also started a $2 million expansion program. When completed, milling would increase from 7,500 to about 10,000 tons per month. Exploration continued at the Monarch Mine on the Mozambique border near Mutare. Lonrho purchased Corsyn Consolidated Mines Ltd. from the Republic of South Africa based Coronation Syndicate Ltd. Included in the sale were the Anzac, Arcturus, Mazowe, and Muriel Mines.

RTZ operated three gold mines and three mine dump-leaching operations. Renco Mine, the largest gold producer in Zimbabwe, produced approximately 65,000 ounces of gold per year. The other two mines, Brompton and Patchway, produced approximately 8,500 ounces of gold each.

ZMDC and two of its subsidiaries were involved in nine gold mining operations during 1987. The development of the old Elvington Mine was announced late in the year. The mine had been abandoned in the 1930's, but still contains reserves of approximately 3.7 million tons of ore. ZMDC was planning a 150,000-ton-per-year operation for Elvington Mine at an average gold content of 5.5 grams per ton. Total development costs at Elvington Mine will be from $9 to $12 million. ZMDC's Jena Mines (Pvt.) Ltd. owns and operates three gold mines. The mines, Leopard and Leopardess, both started before 1915, and Termite, at least 40 years old, were in the process of being renovated. A new $3.5 million gold reduction commissioned early in 1987 at the Jena operation, 80 kilometers west of Kwekwe. The new plant capacity of 300 tons per day was three times greater than the old capacity and will increase the recovery of gold from 65% to 93%.

A relative newcomer to Zimbabwe, in terms of gold mining, was the Australian gold producer, the Sons of Gwalia (Zimbabwe) (Pvt.) Ltd , a subsidiary of Chase Minerals. It was involved in approximately 12 projects, which included the Steamboat-Better Group, Redrue Kop Group, Adzwe Mine, Mont D'Or Mine, and the Connemara Mine.

Zimbabwe's first gold refinery was under construction in 1987 and due for completion in March 1988. Technical assistance was provided by the Australian Perth Mint Co.

The plant's capacity of 50 tons (1.46 million ounces) of gold per year exceeds the expected 1987 needs by approximately 34 tons (990,000 ounces). Break-even operation of the plant was estimated to be 30 tons (880,000 ounces) of gold per year.

**Iron and Steel.**—The Buchwa Iron Mining Co. (Pvt.) Ltd. produced 1.3 million tons of iron ore concentrates for Zimbabwe Iron and Steel Co. Ltd. (ZISCO) steel mill at Redcliff, Zimbabwe. The 1987 production amounted to a 6.4% production increase when compared with that of 1986. Of the total iron ore produced at its two open pit mines, 874,315 tons (69%) came from the Buchwa Mine and 397,150 tons (31%) came from the Ripple Creek Mine. Buchwa Mine production was 6.7% lower and Ripple Creek Mine production was 54% higher than in 1986.

ZISCO's plant complex had an annual capacity to produce 1 million tons of crude steel, and it was ranked as the second-largest steel producer in southern Africa. In 1987, the mill produced 597,000 tons of crude steel, a 11.4% decrease from its 1986 production. A new managing director was appointed in 1987 to head up ZISCO along with an all new 12-member board. A new $370,000 study began in 1987 and was designed to help develop domestic, regional, and other exports as the first step in a new $300 million rehabilitation program for ZISCO. The market study would identify the major iron and steel users in the Africa Preferential Trade Area region, which embraced 15 countries in eastern and southern Africa, and assess growth potential over the next 10 years and ZISCO's ability to meet expected demands.

**Nickel.**—The only nickel producer from nickel ore in Zimbabwe was Anglo American's BNC. The average grade of nickel in the ore was 0.6%. Although the company made net operating profits during the year, its financial stability was threatened by a high debt burden. The Bindura smelter and refinery toll refined nickel-copper matte from Botswana's nickel-copper-cobalt mine at Selebi-Phikwe. It also toll refined nickel sulfates from the Republic of South Africa. RTZ also operated its Eiffel Flats refinery for the same toll products.

BNC operated four nickel mines in 1987, Epoch, Madziwa, Shangani, and Trojan. Although Anglo American remained a major shareholder in BNC, credit facilities from the Anglo American group were exhausted and BNC had to seek total financing from the Zimbabwean Government. Loans to BNC by Anglo American were scheduled to be repaid by the end of the calendar year. Despite the rise in nickel prices late in 1987, discussions were held about closing the mines and refinery owing to the high debt burden. The decision to close the operations depended on whether the Government could provide financial assistance and whether Anglo American Zimbabwe would forgive BNC's debt.

**Tin.**—Kamativi Tin Mines Ltd. completed its first full year under ZMDC management in 1987. The operations, procured in November 1986, underwent considerable modifications. ZMDC held 91.3% of all the stock in Kamativi, and the remaining stock was held by private overseas investors. The company planned to double its output of tantalite concentrates to almost 9 tons per month in the near future. Kamativi planned a new plant that would split the heavy-mineral fraction into a 65% tin concentrate, a 36% tantalum pentoxide concentrate, and a 52% niobium pentoxide concentrate. KHD Humboldt Wedag AG was scheduled to supply the core units for the preparation plant, which included a low-intensity wet magnetic separator, a high-intensity Jones magnetic separator, and a secondary drying facility.

The deposits of pegmatitic tin ores at Kamativi contained feldspar, biotite, muskovite, lepidolite, quartz, and columbite with grades ranging from 80 to 200 parts per million columbium (niobium). The pegmatite also included garnet, which was removed by dry magnetic separation.

## INDUSTRIAL MINERALS

**Asbestos.**—Asbestos production came from two underground mines, the King Mine in the Mashaba area and the Shabanie Mine near Zvishavane. Production of asbestos increased by 18% over that of 1986 to approximately 194,000 tons. The value of asbestos decreased by $10.21 per ton in 1987 to $304 per ton.

The King Mine had its own 120,000-ton-per-year mill on the site. The mine and mill were run on a three-shift basis utilizing 1,200 employees, 50% of which worked underground and 960 (80%) were semiskilled or unskilled. The King mill processed three grades of asbestos.

The Shabanie Mine had its own 200,000-ton-per-year mill on the site. The 350-foot-high Shabanie mill contained 16 stories above ground and 2 below ground. The mill

cost $100 million and employed 1,066 people; 106 were professionals and 960 were semiskilled or unskilled. Six grades of asbestos were produced at Shabanie, grading No. 1 as the poorest and No. 6 as the best, which was composed of long fibers that were exceptionally clean. Asbestos at the Shabanie mill was shipped to customers in 50-kilogram plastic bags. Sales were made to the Middle East and Far East countries and to Eastern and Western European countries.

India signed two trade barter contracts with Zimbabwe during 1987 to take $7.8 million in asbestos up to July 1988. Part of the proceeds from the contracts accrued as foreign exchange, but the larger part was allocated by the Government for imports of essential mining parts and machinery from India. Fourteen local Zimbabwean factories used Zimbabwean asbestos to produce a variety of products for domestic and export markets. The local factories employed 2,000 people.

**Graphite.**—Graphite was produced by the Lynx Mine in northern Zimbabwe's Karoi area. The mine was formerly known as the Gwerman Graphite Mine. ZMDC took control of the mine from the IDC in late 1987 after lengthy negotiations. Production decreased, although profits increased in 1987. The graphite was marketed in flake and powder form to buyers principally in the Federal Republic of Germany, France, the Republic of South Africa, Spain, Taiwan, the United Kingdom, the United States, and Zambia.

**Kyanite.**—ZMDC shipped 34 tons of kyanite and 17 tons of plastic clay to India for pilot plant tests on making refractory brick in 1987. The kyanite was produced at ZMDC's mine near Mutoko.

**Lithium.**—Bikita Minerals (Pvt.) Ltd.'s mine, founded in 1952 and located 80 kilometers east of Masvingo, was the sole producer of lithium minerals in Zimbabwe. The petalite ore from the Al Hyat quarry was processed to yield spodumene and lepidolite concentrates and pollucite. Although production was planned to be increased to 74,000 tons per year, the mine did not operate in 1987. Large stockpiles of petalite ore were sufficient to feed a new $3.5 million triflow-separator plant that had not previously been used to process petalite, only coal. The new plant's success was due to the expertise of British Petroleum Minerals (BP), the major stockholder in Bikita. The $3.5 million expansion program has changed the mine's operations and future. The life of the mine was extended by more than 21 years. Sale of lithium products decreased by 54% in 1987 as a result of bringing the new plant on-line. The other shareholders in Bikita were AMAX Inc. and Kerr McGee Chemical Corp., both U.S. companies. Lithium was used in the production of zero expansion glass, frits and enamels, and as a flux in the steel industry.

## MINERAL FUELS

**Coal.**—Wankie Colliery Co. Ltd., the only coal mining operation in Zimbabwe, included an underground mine and an open pit with a coal preparation plant at each of the two mines. Anglo American purchased the operations at Wankie in 1953 and controlled the operations until Zimbabwe's independence in 1980, when the Zimbabwean Government took control of the mines. Anglo American continued to manage the mines through September 1987, when ZMDC took over the management role. The Zimbabwean Government took control in 1980 by purchasing 40% of Anglo American's stock. Several other minority stockholders still hold some shares in the company.

Wankie had four underground operations in the past, but operated only the No. 3 Mine in 1987. The mine operated in the lower 8 feet of a 41-foot-thick coal seam, mining only 40% of the bottom 8 feet. The bottom part of the coal seam was lower in phosphorus and sulfur and thus had better coking quality. Coal from the underground mine was made into coke nearby and then shipped to the Zimalloy ferrochromium smelter and the ZISCO steel mill. The mine produced approximately 720,000 tons of coal in 1987, but will increase production to 1 million tons in the near future.

Wankie had five open pit operations in the past, but operated only one in 1987. It removed 82 feet of overburden to mine 41 feet of coal. Although the bottom 8 feet of coal was metallurgical quality, the entire seam was utilized for steam coal. The steam coal was chiefly used at Zimbabwe's 920-megawatt powerplant nearby. Other markets included the cement, mining, and tobacco industries. Small amounts of coal were shipped to Botswana, Malawi, Mozambique, and Zambia.

**Coke.**—Work on the brick relining of the Wankie coke ovens began early in 1987 after dismantlement in late 1986. The coke ovens, east of the Wanga Village, were to be completely rejuvenated by yearend. The

ovens were slated to produce 15,000 tons of coke per month. Four coke byproducts were slated for production: ammonium liquors, benzole, naphthalene, and tar. Only benzol and tar were to be sold as no known markets existed for ammonium liquors and naphthalene.

**Petroleum.**—Seismic studies were made on the southern side of the Zambezi River Valley to test for viable oil deposits. It was the first time that hydrocarbon exploration was attempted in the area.

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[1]Physical scientist, Division of International Minerals.
[2]Where necessary, values have been converted from Zimbabwean dollars (ZD) to U.S. dollars at the rate of ZD1.66=US$1.00.

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